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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,593	12/08/2003	Gregg Baeckler	015114-066700US	3875

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EXAMINER

LO, SUZANNE

ART UNIT PAPER NUMBER

2128

DATE MAILED: 10/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/731,593	<b>Applicant(s)</b> BAECKLER, GREGG	
	<b>Examiner</b> Suzanne Lo	<b>Art Unit</b> 2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2003.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

1. Claims 1-35 have been presented for examination.

**Claim Rejections - 35 USC § 112**

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-16, 18-19, and 20-35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2-3, 18, and 21-22 recites the limitation "the fixed-configuration secondary hardware".

There is insufficient antecedent basis for this limitation in the claim.

In claims 1-2, 4-10, 14, 19-21, 23-29, and 33 the term "potential input assignment" is vague and indefinite as it is unclear what differentiates between a potential input assignment and a non-potential assignment. Although the claims are read in light of the specification, the limitations of the specification are not read into the claims.

In claims 1, 6, 9, 20, 25, and 28 the term "highest ranked" is vague and indefinite. Although the specification recites possible ranking factors such as power consumption and number of gates, it also states that there could be any other factors alone or in combination with power consumption and number of gates as only examples.

All other claims not specifically treated are rejected by virtue of their dependency.

The Examiner requests the Applicant provide specific sections of the specification to support the vague and indefinite terms. As noted above, although the claims are read in light of the specification, the limitations of the specification are not read into the claims.

**Claim Rejections - 35 USC § 101**

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 20-35 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Specifically, there is no tangible result produced such as an output file or a display.

**Claim Rejections - 35 USC § 102**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-2, 4-9, 16-21, 23-28, and 35 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Loong (U.S. Patent No. 7,020,864 B1).

As per claim 1, Loong is directed to a method of determining an implementation of a user design on a programmable device including reconfigurable logic hardware and fixed-configuration secondary hardware (Figure 8), the method comprising: determining a plurality (column 8, lines 43-55) of potential input assignments (column 4, lines 33-36) for a portion of the user design corresponding with at least one function of the fixed-configuration hardware (column 12, lines 9-22); ranking the plurality of potential input assignments (column 8, lines 54-49); and selecting the highest ranked input assignment as an implementation of at least a subset of the portion of the user design (column 8, lines 54-49).

As per claim 2, Loong is directed to the method of claim 1, wherein each of the plurality of potential input assignments defines an assignment of at least one input variable of the user design to an input of the fixed configuration secondary hardware (column 11, line 65- column 12, line 22).

As per claim 4, Loong is directed to the method of claim 1, wherein each of the plurality of potential input assignments is associated with at least one register of the user design (Figures 4A-5C and accompanying text).

As per claim 5, Loong is directed to the method of claim 4, wherein ranking the plurality of potential input assignments includes determining the number of registers of the user design associated with each of the plurality of potential input assignments (column 8, lines 54-59).

As per claim 6, Loong is directed to the method of claim 5, wherein selecting the highest ranked input assignment includes selecting the potential input assignment with the most associated registers from the plurality of potential input assignments (column 8, lines 54-59).

As per claim 7, Loong is directed to the method of claim 4, comprising disassociating at least one register from at least one of the plurality of potential input assignments, wherein the disassociated register is associated with the selected potential input assignment (column 8, lines 54-59).

As per claim 8, Loong is directed to the method of claim 1, comprising removing the selected potential input assignment from the plurality of potential input assignments, thereby forming a subset of the plurality of potential input assignments (column 8, lines 54-59).

As per claim 9, Loong is directed to the method of claim 8, comprising evaluating a criteria for the subset of the plurality of potential input assignments; and in response to a determination that the criteria exceeds a threshold, reiterating the steps of determining a plurality of potential input assignments, ranking the plurality of potential input assignments, and selecting the highest ranked input assignment for the subset of the plurality of potential input assignments (column 8, lines 54-59).

As per claim 16, Loong is directed to the method of claim 1, further comprising: programming the programmable device with the highest ranked input assignment as at least the subset of the portion of the user design (column 8, lines 54-59).

As per claim 17, Loong is directed to a programmable device adapted for implementing a user design, comprising: reconfigurable logic hardware adapted to implement a first portion of the user design (column 12, lines 2-8); and fixed-configuration secondary hardware adapted to implement a second portion of the user design, wherein the second portion of the user design is determined by an assignment of at least one input variable of the second portion of the user design to at least one function of the fixed-configuration hardware (column 12, lines 9-22).

As per claim 18, Loong is directed to the programmable device of claim 17, further comprising: a plurality of logic cells, each logic cell including a register (column 11, lines 53-55) connected with a unit of the reconfigurable logic hardware and a unit of the fixed-configuration secondary hardware (column 11, line 65 – column 12, line 22).

As per claim 19, Loong is directed to the programmable device of claim 17, wherein the assignment of at least one input variable is selected from a plurality of potential input assignments (column 4, lines 33-36), each potential input assignment being associated with at least one register (Figures 4A-5C and accompanying text), and further wherein the assignment is selected from the plurality of potential input assignments according to the number of associated registers (column 8, lines 54-49).

As per claims 20-21, 23-28, and 35, Loong is directed to an information storage medium (column 12, line 65 – column 13, line 2) including a set of instructions adapted to operate an information processing device to perform a set of steps, the set of steps comprising the method steps of claims 1-2, 4-9, 16-19 and are therefore rejected under the same prior art.

**Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. **Claims 3 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loong (U.S. Patent No. 7,020,864 B1).**

As per claim 3, Loong is directed to the method of claim 1, but does not specifically disclose wherein the fixed-configuration secondary hardware enables load and clear functions of a register of the programmable device but it would have been obvious to one of ordinary skill in the art to enable the load and clear functions of the register in order to operate said register.

As per claim 22, Loong is directed to an information storage medium (column 12, line 65 – column 13, line 2) including a set of instructions adapted to operate an information processing device to perform a set of steps, the set of steps comprising the method steps of claim 3 and are therefore rejected over the same prior art.

6. **Claims 10-13 and 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loong (U.S. Patent No. 7,020,864 B1) in view of Wallace (U.S. Patent No. 7,020,855).**

As per claim 10, Loong is directed to the method of claim 2, but fails to specifically disclose wherein determining a plurality of potential input assignments comprises: enumerating a plurality of sets of input variables associated with the portion of the user design; and creating a plurality of potential input assignments from at least a portion of the sets of input variables. Wallace teaches enumerating sets of input variables (column 4, lines 44-53) and creating a plurality of input assignments (column 4, lines 15-29). Loong and Wallace are analogous art because they are both from the same field of endeavor, implementing a user design on a programmable device. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the method of programming a device of Loong with the method of determining input assignments of Wallace in order to offer greater opportunities for optimization (Wallace, column 4, lines 20-35).

As per claim 11, the combination of Loong and Wallace already discloses the method of claim 10, further comprising: creating a logic diagram describing the function of each of the plurality of sets of input variables; and determining from the logic diagram whether the function of each of the plurality of sets of input variables corresponds with at least one function of the fixed-configuration hardware (Wallace, column 4, lines 44-53).

As per claim 12, the combination of Loong and Wallace already discloses the method of claim 11, wherein the logic diagram is a truth table the combination of Loong and Wallace already discloses (Wallace, column 4, lines 44-53).

As per claim 13, the combination of Loong and Wallace already discloses the method of claim 11, but does not specifically disclose wherein the logic diagram is a Karnaugh map but it would have been obvious to one of ordinary skill in the art to include the above limitation to easily derive complex sets of input variables.

As per claims 29-32, Loong is directed to an information storage medium (column 12, line 65 – column 13, line 2) including a set of instructions adapted to operate an information processing device to



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perform a set of steps, the set of steps comprising the method steps of claims 10-13 and are therefore rejected over the same prior art combination.

7. **Claims 14-15 and 33-34** are rejected under 35 U.S.C. 103(a) as being unpatentable over Loong (U.S. Patent No. 7,020,864 B1) and Wallace (U.S. Patent No. 7,020,855) **in further view of Cong et al. ("Cut Ranking and Pruning: Enabling a General and Efficient FPGA Mapping Solution")**.

As per **claim 14**, the combination of Loong and Wallace is directed to the method of claim 11, but fails to explicitly disclose wherein creating a plurality of potential input assignments comprises applying at least one heuristic to each of the plurality of sets of input variables having a function corresponding with at least one function of the fixed-configuration hardware, thereby determining at least one corresponding potential input assignment. Cong teaches applying a heuristic to sets of input variables to determine possible input assignments (page 30, Section 3). Loong, Wallace, and Cong are analogous art because they are from the same field of endeavor, implementing a user design on a programmable device. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the method of programming a device of Loong and Wallace with the step of applying a heuristic of Cong in order to handle different optimization objectives (Cong, page 29, Section 1, 3<sup>rd</sup> paragraph).

As per **claim 15**, the combination of Loong and Wallace is directed to the method of claim 10, wherein enumerating a plurality of sets of input variables includes using cut enumeration. Cong teaches applying a heuristic through cut enumeration to sets of input variables to determine possible input assignments (page 29, Section 1, 2<sup>nd</sup> paragraph). Loong, Wallace, and Cong are analogous art because they are from the same field of endeavor, implementing a user design on a programmable device. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the method of programming a device of Loong and Wallace with the step of applying a heuristic of cut enumeration of Cong in order to handle different optimization objectives (Cong, page 29, Section 1, 3<sup>rd</sup> paragraph).

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As per claims 33-34, Loong is directed to an information storage medium (column 12, line 65 – column 13, line 2) including a set of instructions adapted to operate an information processing device to perform a set of steps, the set of steps comprising the method steps of claims 14-15 and are therefore rejected over the same prior art combination.

**Conclusion**

8. The prior art made of record is not relied upon because it is cumulative to the applied rejection.

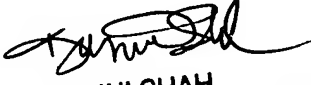
These references include:

1. U.S. Patent No. 5,748,488 issued to Gregory et al. on 05/05/98.
2. U.S. Patent No. 6,086,626 issued to Jain et al. on 07/11/00.
3. U.S. Patent No. 6,026,230 issued to Lin et al. on 02/15/00.

9. All Claims are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Suzanne Lo whose telephone number is (571)272-5876. The examiner can normally be reached on M-F, 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571)272-2297. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

  
KAMINI SHAH  
SUPERVISORY PATENT EXAMINER

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Suzanne Lo  
Patent Examiner  
Art Unit 2128

SL  
09/29/06